

What is claimed is:

1 1. An electronic package having one or more components  
2 comprising:  
3 a substrate having a first coefficient of thermal  
4 expansion;  
5 a lid attached to said substrate, said lid including a  
6 vapor chamber, the lid having a second coefficient of  
7 thermal expansion, said first coefficient of thermal  
8 expansion matched to said second coefficient of expansion;  
9 a thermal transfer medium in contact with a back  
10 surface of each component and an outer surface of a lower  
11 wall of said lid; and  
12 each component electrically connected to a top surface  
13 of said substrate.

1 2. The electronic package of claim 1, wherein said lower  
2 wall of said lid has a third coefficient of thermal  
3 expansion and said components have a fourth coefficient of  
4 expansion, said third coefficient of expansion matched to  
5 said fourth coefficient of expansion.

1 3. The electronic package of claim 1, further including a  
2 heat sink having a fifth coefficient of thermal expansion  
3 mounted to an outer surface of a top wall of said lid, said  
4 fifth coefficient of expansion matched to said second  
5 coefficient of expansion.

1 4. The electronic package of claim 1, wherein said lower  
2 wall of said lid has protruding regions for maintaining  
3 equivalent contact with said thermal transfer medium on thin  
4 components of said components as is maintained by thin  
5 regions on thick components of said components.

1 5. The electronic package of claim 1, further including  
2 supports within said vapor chamber between an upper wall of  
3 said vapor chamber and said lower wall, some or all of said  
4 supports aligned over some or all of said components.

1 6. The electronic package of claim 5, wherein said supports  
2 are integrally formed with said lid.

1 7. The electronic package of claim 1, wherein said package  
2 is selected from the group consisting of ball grid array

3 modules, pin grid array modules, land grid array modules and  
4 HyperBGA™ modules.

1 8. The electronic package of claim 1, wherein said lid is  
2 formed from material selected from the group consisting of  
3 aluminum, copper, Invar, gold, silver, nickel, aluminum-  
4 silicon carbide, plastics, ceramics and composites.

1 9. The electronic package of claim 1, wherein said substrate  
2 includes material selected from the group consisting of  
3 ceramics, fiberglass, polytetraflouroethylene, and polymers.

1 10. A method for dissipating heat from an electronic package  
2 having one or more components comprising:  
3       providing a substrate having a first coefficient of  
4 thermal expansion;  
5       attaching a lid to said substrate, said lid including a  
6 vapor chamber, the lid having a second coefficient of  
7 thermal expansion;  
8       matching said first coefficient of thermal expansion  
9 matched to said second coefficient of expansion;  
10       providing a thermal transfer medium in contact with a  
11 back surface of each component and an outer surface of a  
12 lower wall of said lid; and  
13       electrically connecting each component to a top surface  
14 of said substrate.

1 11. The method of claim 10, wherein said lower wall of said  
2 lid has a third coefficient of thermal expansion and said  
3 components have a fourth coefficient of expansion and  
4 further including matching said third coefficient of  
5 expansion to said fourth coefficient of expansion.

1 12. The method of claim 10, further including:

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2 mounting a heat sink having a fifth coefficient of  
3 thermal expansion to an outer surface of a top wall of said  
4 lid, and  
5 matching said fifth coefficient of expansion to said  
6 second coefficient of expansion.

1 13. The method of claim 10, wherein said lower wall of said  
2 lid has protruding regions for maintaining equivalent  
3 contact with said thermal transfer medium on thin components  
4 of said components as is maintained by thin regions on thick  
5 components of said components.

1 14. The method of claim 10, further including providing  
2 supports within said vapor chamber between an upper wall of  
3 said vapor chamber and said lower wall, some or all of said  
4 supports aligned over some or all of said components.

1 15. The method of claim 10, wherein said package is selected  
2 from the group consisting of ball grid array modules, pin  
3 grid array modules, land grid array modules and HyperBGA™  
4 modules.

1 16. The method of claim 1, wherein said lid is formed from  
2 material selected from the group consisting of aluminum,  
3 copper, Invar, gold, silver, nickel, aluminum-silicon  
4 carbide, plastics, ceramics and composites.

1 17. The method of claim 10, wherein said substrate includes  
2 material selected from the group consisting of ceramics,  
3 fiberglass, polytetraflouroethylene, and polymers.

1 18. An electronic package having one or more components  
2 comprising:  
3 a substrate having a first coefficient of thermal  
4 expansion;  
5 a lid attached to said substrate, said lid including a  
6 vapor chamber, the lid having a second coefficient of  
7 thermal expansion, said first coefficient of thermal  
8 expansion between about 25% to about 700% of said second  
9 coefficient of expansion;  
10 a thermal transfer medium in contact with a back  
11 surface of each component and an outer surface of a lower  
12 wall of said lid; and  
13 each component electrically connected to a top surface  
14 of said substrate.

1 19. The electronic package of claim 18, wherein said lower  
2 wall of said lid has a third coefficient of thermal  
3 expansion and said components have a fourth coefficient of  
4 expansion, said third coefficient of thermal expansion  
5 between about 50% to about 700% of said fourth coefficient  
6 of expansion.

1 20. The electronic package of claim 18, further including a  
2 heat sink having a fifth coefficient of thermal expansion  
3 mounted to an outer surface of a top wall of said lid, said  
4 fifth coefficient of expansion between about 25% to about  
5 700% of said first coefficient of expansion.